COURSE TITLE: Data Analysis in Cancer Research

CODIFICATION: INTD 8065

NUMBER OF CREDITS HOURS: 2 semester credits

CONTACT HOURS: 36

NAME OF COORDINATOR(S): José Rodríguez Medina, Ph.D. & Humberto Ortiz, Ph.D.

PRE-REQUISITES: -Calculus I or equivalent

-Basic course in statistics or biostatistics.

CO-REQUISITES: N/A

SCHEDULE: Fridays, 1:00 - 3:30 PM (Starting January 22)

COURSE DESCRIPTION

Through lectures, group discussions and other active learning strategies, this course will introduce the students to statistical and computing methods for observational studies and clinical trials. The students will acquire knowledge in basic concepts of Data Analysis, utilizing Biostatistics and Bioinformatics tools, and applying these to biomedical/translational cancer and population sciences research.

TERMINAL OBJECTIVES

At the end of the course, students will be able to:

1.   Apply the basic methods of data analysis and the elementary concepts of Biostatistics and Bioinformatics in applications related to Cancer Research.

2.   Use powerful and flexible software (such as R and BioConductor software packages) to effectively put into practice data analytic techniques in Cancer Research and be able to develop inferences.

3.   Develop case studies utilizing cancer data.

COURSE CONTENT AND TIME DISTRIBUTION

Lecture / Topic	Time Allocation
Introduction to Biostatistics General Introduction to R in Biostatistics	2.5 hours
How to Generate Descriptive Statistics in R	2.5 hours
How to Generate Inferential Statistics in R	2.5 hours
Testing Hypothesis	2.5 hours
Calculation of Sample Size and Power	2.5 hours
Linear Models: Simple Regressions, Hypothesis Testing, and Diagnostics of the Model Multiple linear regression	2.5 hours
One Way Analysis of Variance	2.0 hours
Contingency Tables and Log-linear Models	4.5 hours
Introduction to Bioinformatics and Essentials of BioConductor	2.5 hours
Single and Multiple Sequence Alignment	2.5 hours
Statistical Methods for Analysis of Microarray Data	2.5 hours
Gene Clustering Analysis	2.5 hours
Next Generation Sequencing	2.5 hours
Bioinformatics case study	2.0 hours
Total	36.0 contact hours